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| 10/535,073 | 01/27/2006 | Fereydoun Lakestani | ETF-0022 | 1915 |
| 23413 7590 05/16/2007 CANTOR COLBURN, LLP 55 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002 | | | EXAMINER VAUGHN, MEGANN E | |
| | | | ART UNIT 2859 | PAPER NUMBER |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/535,073

Applicant(s)

LAKESTANI ET AL.

Examiner

Megann E. Vaughn

Art Unit

2859

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 May 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 12-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 12-16, 20-24, 28 and 29 is/are rejected.
- 7) ☒ Claim(s) 17-19, 25-27 and 30 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 May 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 7/21/2005
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 12-15, 20-22, 28, and 29, are rejected under 35 U.S.C. 102(b) as being anticipated by Hashimoto et al (US 5080495).

Regarding claims 12 and 29, Hashimoto et al discloses a method for measuring the thermal diffusivity of an object (Abstract), said method comprising: subjecting a surface region of an object (column 13, lines 34-36), whose thermal diffusivity (α_m) has to be determined, to a modulated laser beam or to a modulated beam of a similar heating source (column 13, lines 41-43) while providing a signal thereof, a heated spot or area of the surface of the object having a definitive diameter (d) and a fixed intensity distribution profile; providing a signal proportional to a temperature on the heated spot or area (column 13, lines 44-46); determining a phase difference or phase shift between the modulated beam signal and the resulting modulated temperature signal (column 13, lines 47-50); using said determined phase difference or shift and an associated modulation frequency to work out the thermal diffusivity value (α_m) of said object (column 13, lines 47-50).

Regarding claim 13, Hashimoto et al discloses said signal of said modulated laser beam or modulated beam of a similar heating source (ac heater) is provided by measuring said beam and providing a signal proportional to a beam intensity (column 3, lines 38-42; column 6, lines 45-53).

Regarding claim 14, Hashimoto et al discloses at least one modulation parameter is subjected to controlled variation (column 6, lines 45-46; column 7, lines 4-7), and wherein the temperature is measured at the center of the heated spot or area (column 7, lines 60-66).

Regarding claim 15, Hashimoto et al discloses that said modulation parameter is frequency (column 7, lines 4-7).

Regarding claims 20-22, Hashimoto et al discloses that the modulated beam signal and the modulated temperature signal are both measured, successively and possibly repetitively, by measuring path and means (column 6, lines 65-67).

Regarding claim 28, Hashimoto et al discloses in figure 2 a system for measuring the thermal diffusivity of an object (Abstract), said system comprising: a laser device or a similar heating source (2) whose beam is directed towards a region or spot on a surface of said object, means for modulating said laser or heating beam (4), means for generating a signal corresponding to said modulated laser or heating beam (4) (column 6, lines 45-48), means for generating a signal corresponding to a modulated temperature of the region or spot struck by the modulated beam (column 6, lines 58-59), and amplifying (7) and measuring means (8) able to determine at least one of a phase difference or shift between the modulated beam signal and the resulting modulated

temperature signal and a thermal diffusivity value (α_m) of said object based upon said phase shift and associated modulation frequency (column 6, lines 65-67; column 3, lines 45-47).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 16 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hashimoto et al (US 5080495) in view of Claybourn et al (US 6260997).

Regarding claim 16, Hashimoto et al discloses the method for measuring the thermal diffusivity of an object as stated above in paragraph 2. Hashimoto et al does not disclose that the thermal diffusivity value (α_m) of the object is evaluated by comparison with at least one reference or reference sample whose thermal diffusivity value (α_m) has been determined previously by being subjected to the same measurement method in similar conditions.

Claybourn et al discloses an apparatus and method for measuring the thermal diffusivity of a surface wherein the thermal diffusivity value (α_m) of the object is evaluated by comparison with at least one reference whose thermal diffusivity value (α_m) has been determined previously by being subjected to the same measurement method in similar conditions (column 7, lines 51-64). Therefore it would have been

obvious to a person having ordinary skill in the art at the time that the invention was made to utilize reference data when determining the thermal diffusivity as taught by Claybourn et al in order to provide more accurate results.

Regarding claim 24, Hashimoto et al discloses the method for measuring the thermal diffusivity of an object as stated above in paragraph 2. Hashimoto et al does not disclose that the beam is modulated by means of an acousto-optical modulator, or a mechanical chopper, driven by an adjustable generator.

Claybourn et al discloses an apparatus and method for measuring the thermal diffusivity of a surface wherein the beam is modulated by a mechanical chopper (column 6, lines 53-56; column 7, lines 3-6; claim 4). Therefore it would have been obvious to a person having ordinary skill in the art at the time that the invention was made to modulate the beam disclosed by Hashimoto et al with a mechanical chopper as taught by Claybourn et al in order to adjust the intensity of the laser beam for various measurements.

5. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hashimoto et al (US 5080495) in view of Knudsen et al (US 4928254).

Regarding claim 23, Hashimoto et al discloses in figure 2 that the measuring path and means include a lock-in amplifier (7). Hashimoto et al does not disclose that the lock-in amplifier is preceded by a preamplifier.

Knudsen et al discloses an apparatus for measuring the diffusivity of the sample wherein the measuring path and means include a preamplifier (22). Therefore it would

Art Unit: 2859

have been obvious to a person having ordinary skill in the art at the time that the invention was made to include a preamplifier as taught by Knudsen et al in the measuring path and means disclosed by Hashimoto et al in order to further amplify the signals as taught by Knudsen et al (column 5, lines 1-4) before they are analyzed for more accurate results.

Allowable Subject Matter

6. Claims 17-19, 25-27, and 30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 17 is allowable over the prior art of record because the prior art of record does not teach or disclose a method for measuring the thermal diffusivity of an object wherein the modulation frequency of the beam is varied and the variation of the phase shift of the latter with respect to the heating source is recorded for a plurality of modulation frequencies, the value of the thermal diffusivity being determined by measuring the shifting required to superimpose respective curves $\Delta\phi = F(f)$ obtained for the object and a reference sample in a diagram with logarithmic frequency scale, in combination with the remaining limitations of the claims.

Claim 18 is allowable over the prior art of record because the prior art of record does not teach or disclose a method for measuring the thermal diffusivity of an object wherein the phase shift between the modulated beam and the corresponding modulated temperature is recorded for the object at a given modulation frequency (f_m), then the

Art Unit: 2859

value of the modulating frequency (f_r) yielding the same phase shift for the reference is determined and finally the value of the thermal diffusivity (α_m) of the object is computed using the formula: $(\alpha_m) = \alpha_r \times (f_m/f_r)$, in combination with the remaining limitations of the claims.

Claim 19 is allowable over the prior art of record because the prior art of record does not teach or disclose a method for measuring the thermal diffusivity of an object wherein the modulation frequency (f_m) of the beam applied to the object is varied until the phase shift between the modulated heating beam and the corresponding modulated temperature reaches a predetermined value obtained previously for the reference at a given modulation frequency (f_r) and that the thermal diffusivity value (α_m) of the object is computed using the formula: $(\alpha_m) = (\alpha_r \times f_m)/f_r$, in combination with the remaining limitations of the claims.

Claims 25-27 and 30 are allowable over the prior art of record because the prior art of record does not teach or disclose a method for measuring the thermal diffusivity of an object wherein the modulated beam signal is generated by a light sensor receiving a deviated part of the beam, in combination with the remaining limitations of the claims.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Mandelis et al (US 5667300).


Art Unit: 2859

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Megann E. Vaughn whose telephone number is 571-272-8927. The examiner can normally be reached on 8 am- 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez can be reached on 571-272-2245. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MEV
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5/14/2007


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